WPT1: D.T1.2.7

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Authors:	**CMBO**
Status (F: final; D: draft; RD: revised draft):	**Final**

1. Introduction

This document arise from the FUA reports of each involved city and will provide the inputs for the deliverable T1.2.11 "understanding Freight behaviour and impact on FUA". It is essential to arrive to a harmonized description of each FUA and to provide a suitable comparison among them.

Each FUA is required to fill in the following form starting from the surveys and tool implementation.

Please note that this template includes the minimum requirements for the SULPiTER project. The information included in this template will be used for the transnational report (D.T1.2.11) and for the final output of the work package O.T1.7.
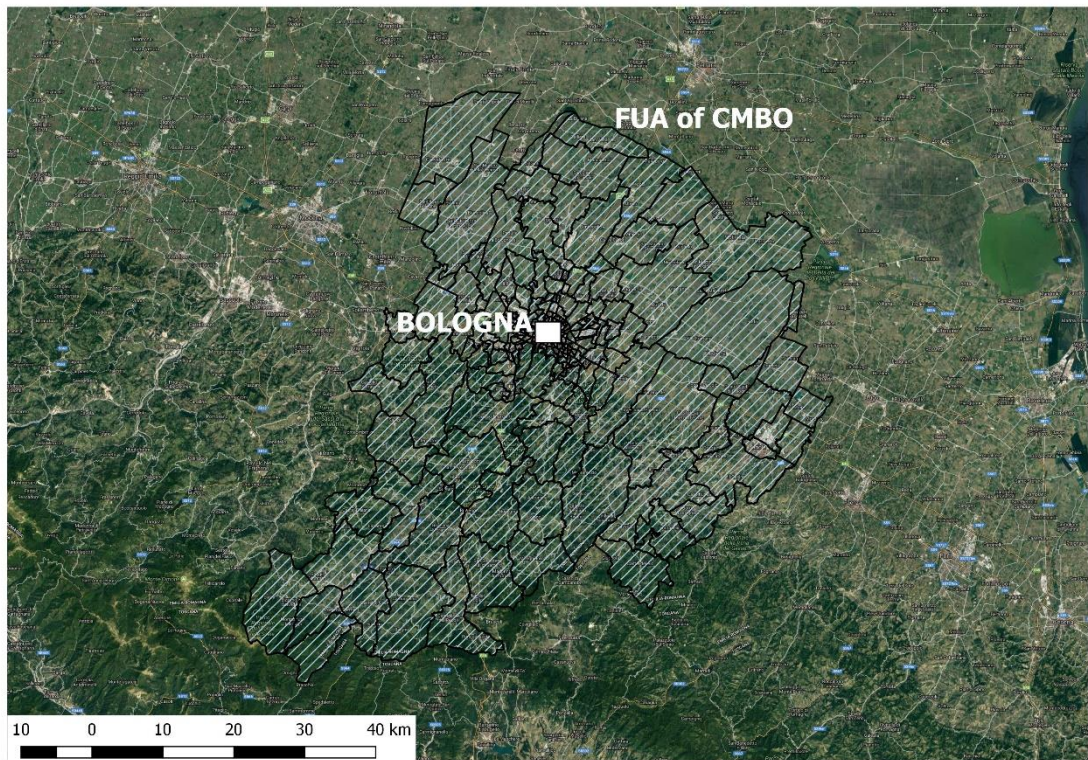
Please, do not answer as a questionnaire (i.e.: yes, no, maybe…) but use the template for elaborating the results of your interviews. As an example, we expect a deep and exhaustive qualitative report. Each component of the survey should be analysed and reported here with comments and interpretation of the results.

Once you completed the report, please format the document removing the tables for a better readability.

2. The territorial contest

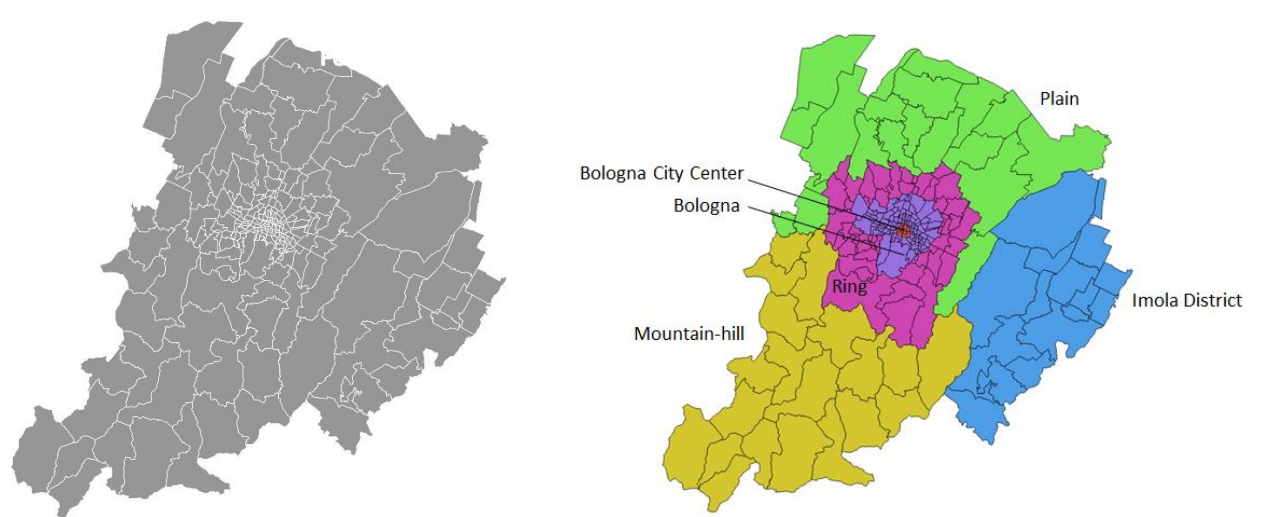The information included in this chapter, are general. Please include also some specific information even if not requested by the template, in order to better focus the area of study.

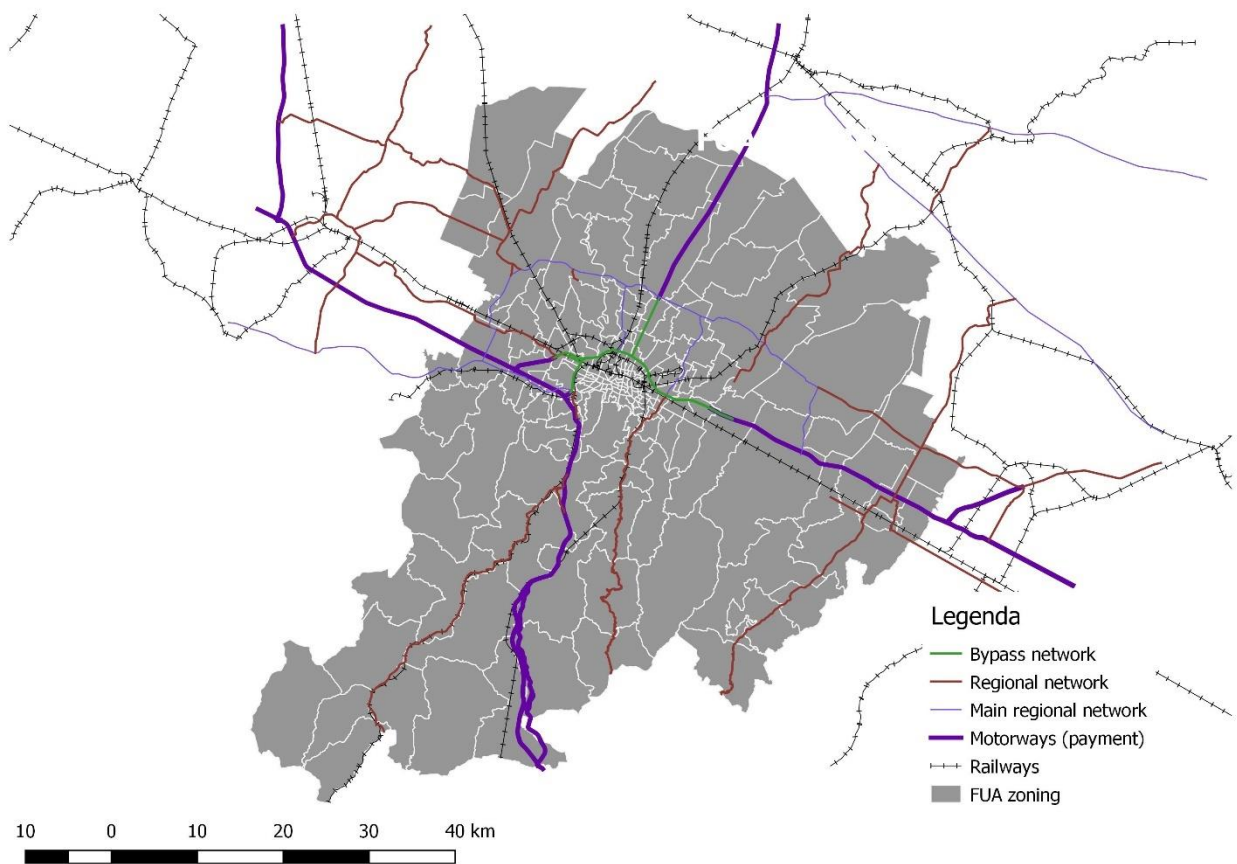| *FUA name* |
| --- |
| The FUA is the Metropolitan City of Bologna, the capital and largest city of the Emilia-Romagna Region. Bologna is also the seventh most populous city in Italy. |

Km² involved in the study-area

The overall area of the Metropolitan City of Bologna is around 3,702 Km2. It is in the centre of the Region and is bounded on the east by the Province of Ravenna, the Province of Ferrara lies to the north while the Province of Modena lies to the west. To the south there are three provinces of Tuscany Region.

N. of inhabitant

The population of the Metropolitan City of Bologna, until 30 June 2017, is 1,009,828 inhabitants. Thirty-nine percent of the inhabitants (389,009) lives in Bologna.

N. of municipalities involved

In the Metropolitan City of Bologna there are fifty-five municipalities. The ten municipalities most populous are Bologna, Imola (69,983), Casalecchio di Reno (36,515), San Lazzaro di Savena (32,353), Valsamoggia (30,782), San Giovanni in Persiceto (28,122), Castel San Pietro Terme (20,888), Zola Predosa (18,962), Budrio (18,489) and Castel Maggiore (18,295).

The first ten municipalities in terms of surface (Km2) are: Imola (205,02), Valsamoggia (178,13), Medicina (159,11), Castel San Pietro Terme (148,42), Bologna (140,86), Molinella (127,84), Budrio (120,19), San Giovanni in Persiceto (114,41), Pianoro (107,13), Monterenzio (105,26).

N. of working units (employers)

In the Metropolitan City of Bologna there are 105,585 companies for 351,710 employers. In the city of Bologna there are the thirty-eight percent of companies (40,369) and the forty percent of employers (140,000).

N. of zones used in the tool and in the o/d matrix

The area of study is composed of 261 zones (in grey). These have been aggregated in six macro-zones: Bologna City Center, Bologna, Ring (Conurbation of Bologna), Plain, Mountain-Hill and Imola district.

Zoning criteria

(nuts level, all of same nuts dimension or not, all similar dimension or different in dimension, ...)

The criterion adopted to divide the area od study in zones have been the administrative borders (especially for small municipalities) and geographic borders (e.g. A1 highway). The city of Bologna and other municipalities (Anzola dell'Emilia, Calderara di Reno, Casalecchio di Reno, Castel Maggiore, Castenaso, Granarolo dell'Emilia, Imola, Pianoro, San Lazzaro di Savena, Sasso Marconi, Zola Predosa) has been divided in more zones in order to represent the characteristics of attraction of the goods, in this case the references were the borders of census areas.

Please insert a map of the study area (if available please attach also the shape file with area and road graph layer)

Legenda
— Bypass network
— Regional network
— Main regional network
— Motorways (payment)
+—+ Railways
� FUA zoning

10   0   10   20   30   40 km

The map of the FUA represented above shows the main road networks and the rail network in the FUA of CMBO. The national motorways crosses the FUA and surronds Bologna through a bypass. Most of the main urban agglomerates are easily accessible from the main roads. As for railways facilities, the area is served by the Interporto of Bologna freight village who guarantees railways accessibilty to national network and links to the European corridors.

3. Current freight mobility impact

This chapter is the core of your report. Please include data and interpretation of the results. This activity should be elaborated in the best possible way in order to understand how freight behaviours are impacting in your FUA.

Analysis of survey on distribution flows. It may include the following aspects:

- Total number of interviews (per supply chain)
- Number of suppliers (average per category …)
- Share of DDP, EX-WORK and OFF TRUCK delivery modes
- Frequency of deliveries and type of load units
- Number of load units per delivery (minimum, maximum, average)
- Usual hours of delivery (distribution)
- Problems and suggestions (short analysis and description)

Please do not include just the figures, but also detail and comment the results.

The number of interviews per supply chain depended on the number of commercial activities in each of the concern study area (FUA), five important supply chains have been identified:

- Wholesale and retail trade and repair of motor vehicles and motorcycles.
- Wholesale trade, except of motor vehicles and motorcycles.
- Retail trade, except of motor vehicles and motorcycles.
- Accommodation.
- Food and beverage service activities.

The number of interviews per supply chain is reported in Table 1 while in Figure 1 the percentage value is reported.

Supply chain	Interviews
Wholesale and retail trade and repair of motor vehicles and motorcycles	*122*
Wholesale trade, except of motor vehicles and motorcycles	*249*
Retail trade, except of motor vehicles and motorcycles	*474*
Accomodation	*21*
Food and beverage service activities	*334*

Table 1 Number of interviews per supply chain

Legend:
- Wholesale and retail trade and repair of motor vehicles and motorcycles.
- Wholesale trade, except of motor vehicles and motorcycles.
- Retail trade, except of motor vehicles and motorcycles.
- Accommodation.
- Food and beverage service activities.
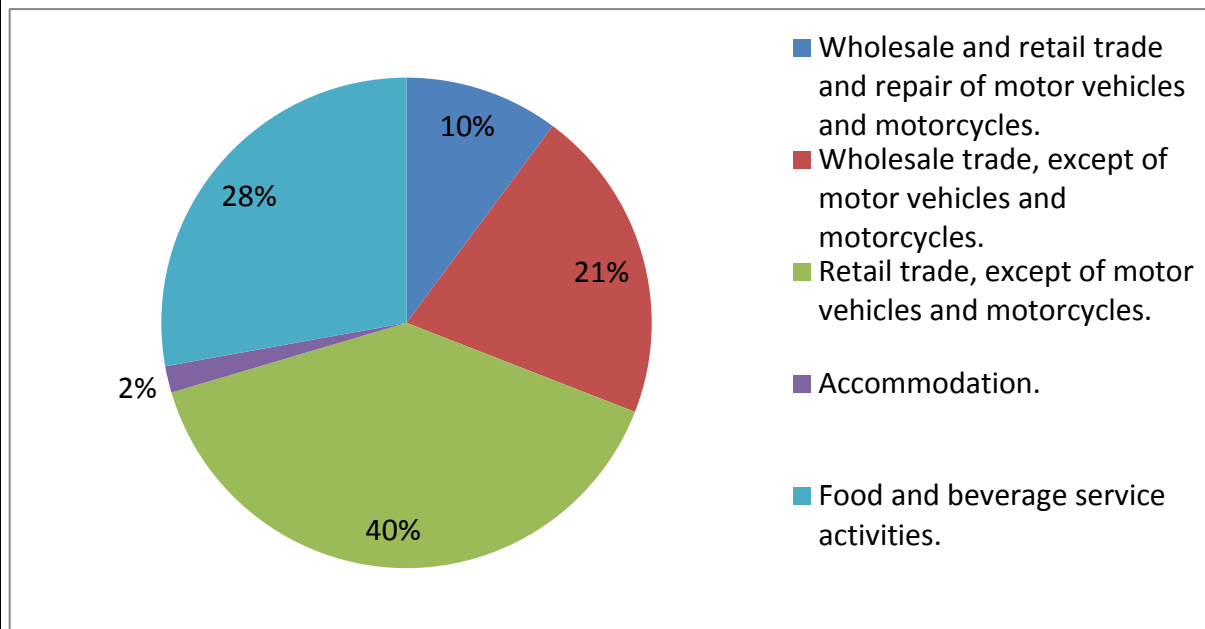
Figure 1 Percentage value per supply chain

Table 2 reports the percentage of the number of typology of suppliers for each supply chain.

	Typology of suppliers (%)				
Supply chain	1	2	3	4	5
Wholesale and retail trade and repair of motor vehicles and motorcycles	74	25	1	0	0
Wholesale trade, except of motor vehicles and motorcycles	87	12	1	0	0
Retail trade, except of motor vehicles and motorcycles	63	25	9	1	1
Accomodation	67	33	0	0	0
Food and beverage service activities	73	23	3	1	0

Table 2 Number of typology of suppliers per Supply Chain

In Figure 2 is reported the percentage, for each supply chain, of the three types of delivery: delivery duty paid, Ex-v

Interreg
CENTRAL EUROPE
SULPiTER
European Union
European Regional
Development Fund
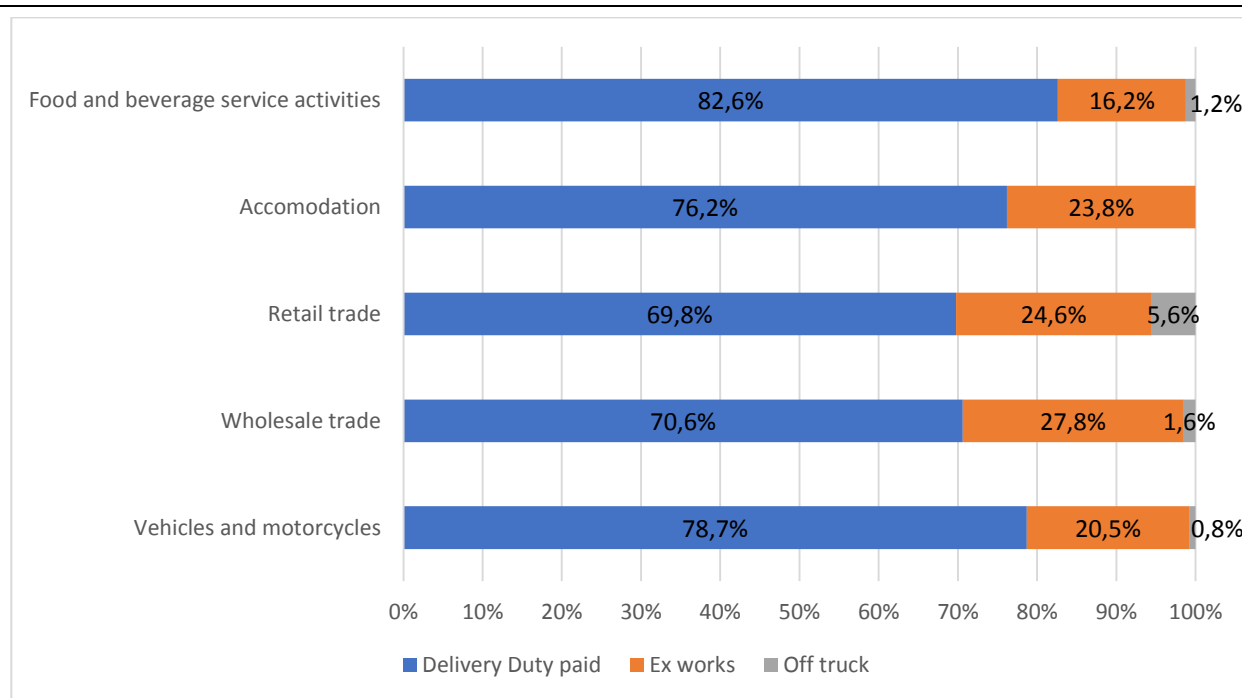
Figure 2 Share of Delivery Duty Paid, Ex-Works and Off Truck delivery modes

The frequency of supply (Figure 3) is prevalently one or more times a week for accommodations (88%), the same ap food services but with a percentage of 68% which is accompanied by a 27% supply for one or more many times a day. I values are more balanced, 42% for weekly deliveries and 31% for daily ones; wholesales trades show the two equivale daily deliveries are higher (53%) than weekly (27%) for vehicles reparations. The monthly deliveries reach a maxim trades, while the annual deliveries with only 7% are not relevant.
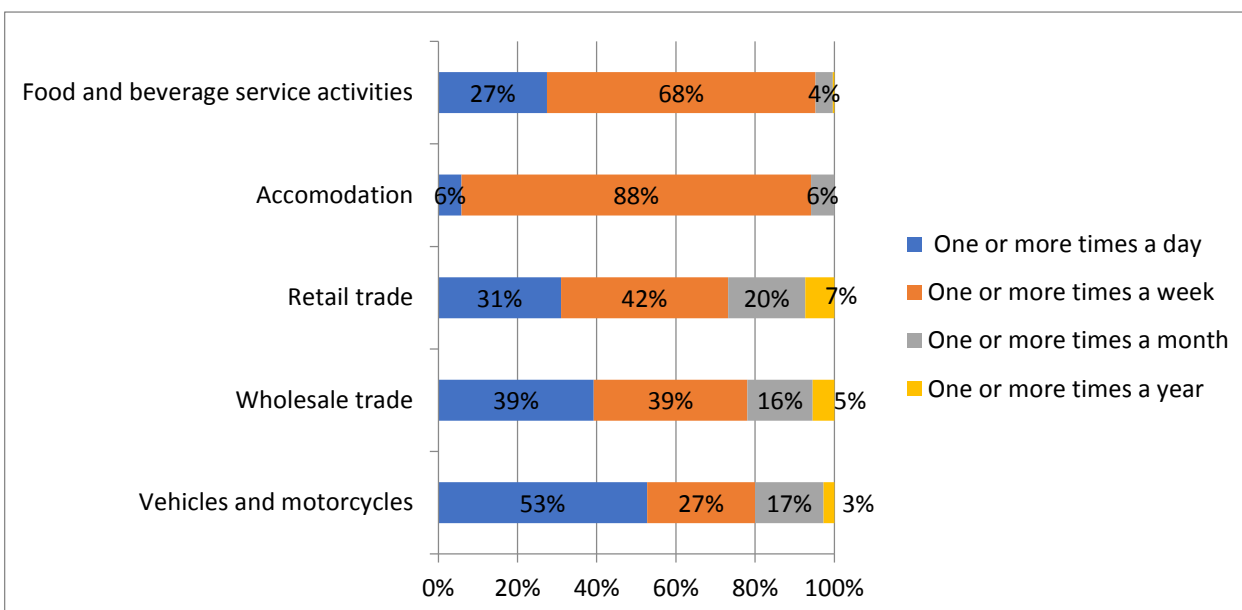
Figure 3 Frequency of deliveries

The main type of packaging used in all the macro sectors considered is the roll. In particular, for the catering and food retail trade account for 70% of the packaging received from the contacted companies. For the wholesale sector, pal packaging received.
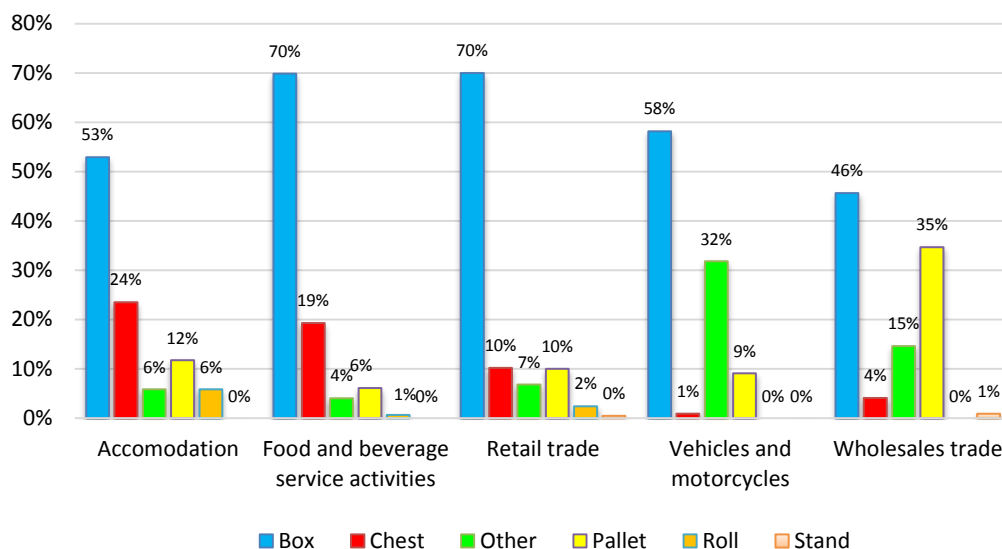
Figure 4 Types of load unit

	Maximum	Average	Minumum
Vehicles and motorcycles	19,9	6,3	1,9
Wholesale trade	40,9	20,7	8,1
Retail trade	40,6	16,3	5,6
Accomodation	16,4	8,6	3,2
Food and beverage service activities	23,0	10,0	3,1

Table 3 Number of load units per delivery (minimum, maximum, average)

The time slots in which most of the procurement operations take place are those of the early hours of the day.

In particular (Figure 5), for retail operations, the prevalent band is that between midnight and six in the morning, catering sectors the intervals between 0-6 and 6-7 show the same levels of activity. The interval between 6 and 7 o'c by vehicle repairs and wholesalers (28% and 33% respectively). For hotels and accommodation, the most used time sl the morning.

The evening hours are not much used.
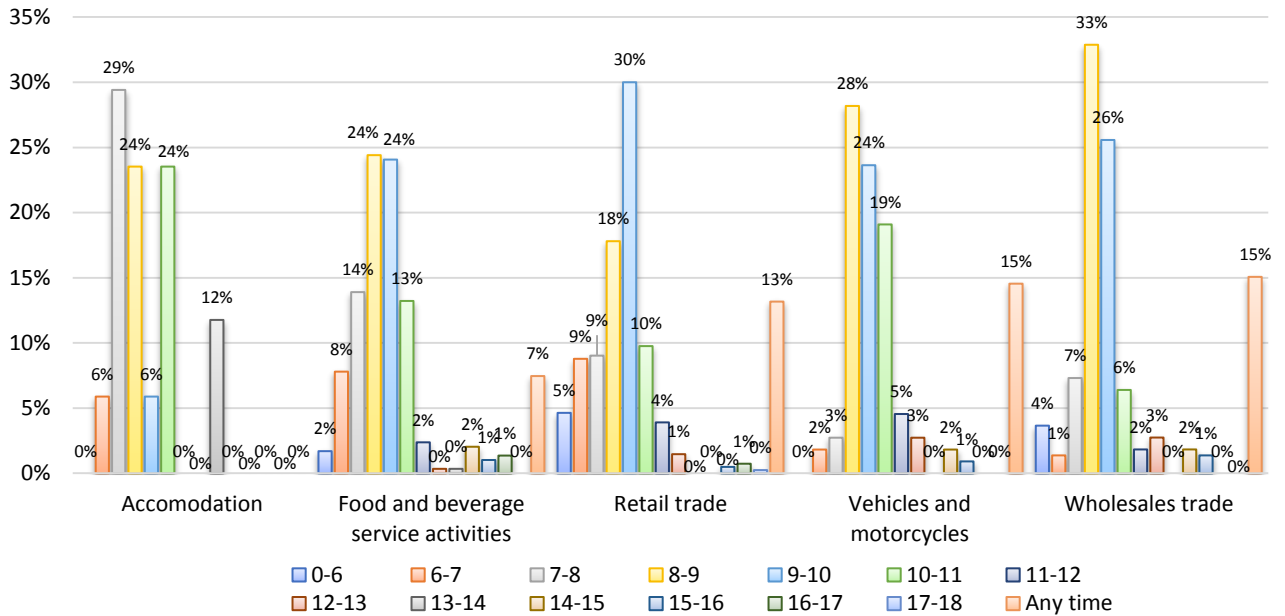
Figure 5 Hourly frequency of delivery (distribution)

At the end of the questionnaire the respondents were asked what were the main problems related the use of the load
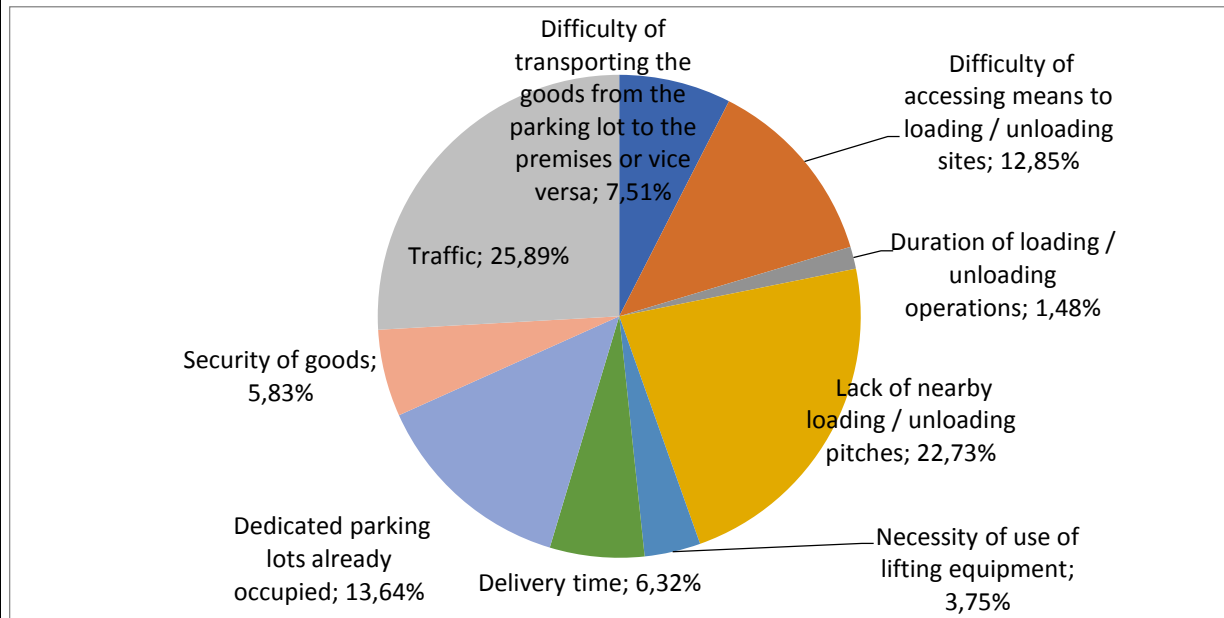
Figure 6 The percentage of the problem related the use oft he loading bay

Analysis of survey on transport operators flows. It may include the following aspects:

- total number of interviews

- type of vehicles

- sequence of movements (number of movements, number of stops per trip)

- typical quantity

- frequency of movements

- parking during deliveries

- main issues

Please do not include just the figures, but also detail and comment the results.

A selection of transport operators has been interviewed in order to gain the most relevant and useful inform
expectations. A database of 250 companies has been analysed to select around the 10% of contacts for direct inter
results from the interviews conducted we can highlight the following:

- Express couriers use sub-carriers to operate transport services on a national scale, employing thousands of
  composed of vans and light trucks. Electric vehicles, methane powered vehicles and cargobikes are operat
  vehicles belongs to Euro4, Euro5 and Euro6 categories.

- Last mile deliveries in the FUA originate mainly from branches of the company, often located in the area o
  and always located outside the urban area of Bologna. Some of the deliveries may originate from internati
  Milan Malpensa) and for this reason are influenced by the delivery hours.

- A delivery in the urban area is around 4 hours long, involves the wholesail and retail trade, is generally onl
  delivery. At least two deliveries per day are performed over more than one day a week.

- Carriers adopt tarpaulined trucks with overall weight over 3.5 t and classified Euro5. A delivery a day is th
  performance.

- Sub-carriers have a diversified fleet, made mainly of vans and providing two o more delivery services a da

As for parking practices, operators declare to park:

- In loading/unloading bays

- In private reserved areas

- In double park

- On the sidewalk

As for delivery hours, operators are used to deliver:

- From 9 to 19 and are available to deliver in other time slots

- From 11 to 17 and are not available to deliver in other time slots

- From 8 to 9 and area available to deliver in other time slots

Among the problems declared by the operators:

- Lack of loading bays

- Difficulty to access loading bays

- Delivery hours

- Security of cargo (during delivery)

- Duration of deliveries

- Difficulty to move goods from parking location to the delivery point

Operators suggested to remove delivery limits, to make the access to urban areas more flexible and with special perm

Analysis on traffic counts. It may include the following aspects:

- AADT (average annual daily traffic)
- Total and for different categories of vehicles

Legenda

Daily freight traffic flows (vehicles)
- 0 - 1000
- 1000 - 5000
- 5000 - 15000
- 15000 - 32586
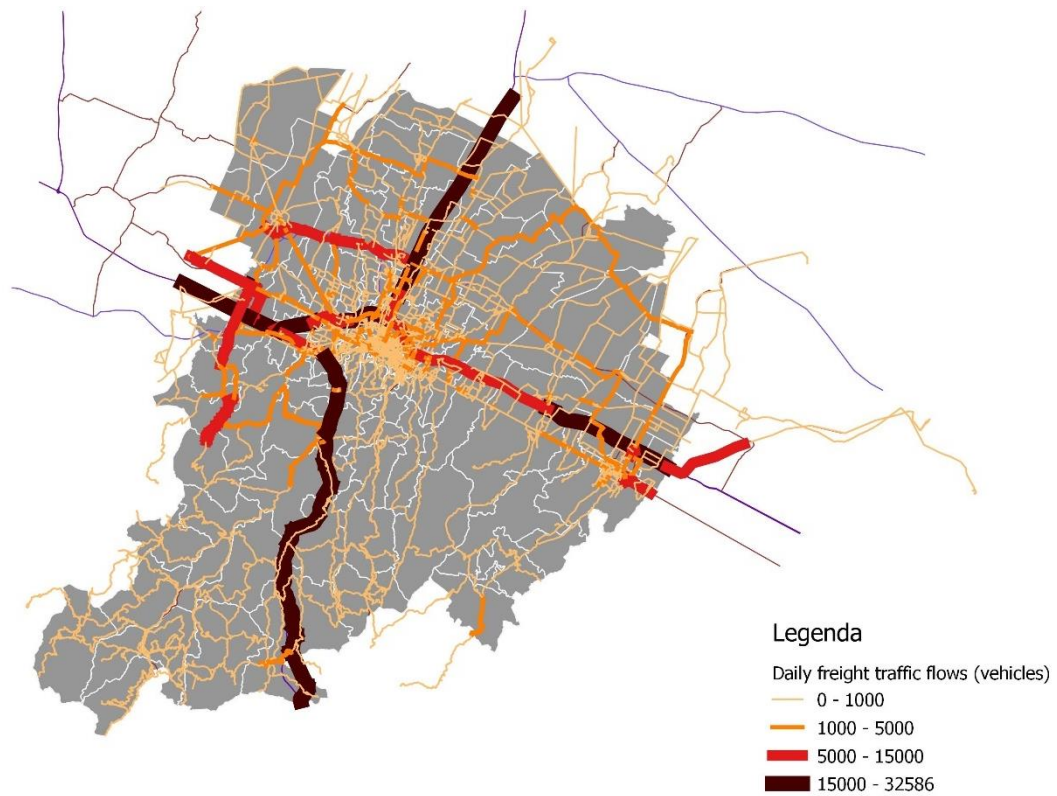
The figure above represents the average daily traffic estimated on the road network of the FUA and derived by the tra
Emilia-Romagna Region, Floating Cars Data and calibration operated with own traffic counts. The largest intensity
motorways, even if a spread of smaller flows is present. The flows represented include small and large trucks.

Please report below the 3 matrixes (quantity, deliveries, vehicles) from the tool, for each considered supply chain

The OD matrices derived from the tool have been attached (excel file) due to the dimension (261x261). Here we
related to the macro-zones in which the FUA has been divided into.

Quantity matrices (kg/day)

Vehicles and motorcycles

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total

Bologna City Centre	20.723	245.729	24.539	22.964	44.653	12.689	0	**371.298**
Bologna	35.793	446.610	44.505	41.984	84.561	22.981	0	**676.435**
Ring	36.369	455.847	45.203	44.946	90.194	24.930	0	**697.489**
Imola District	33.159	417.908	43.680	48.652	82.127	23.601	0	**649.127**
Plain	28.094	366.346	38.150	35.745	70.757	19.511	0	**558.603**
Mountain / Hill	33.007	411.219	43.553	42.427	80.586	24.932	0	**635.725**
Outer area	25.648	325.188	33.923	33.547	64.156	18.817	0	**501.278**
Total	212.793	2.668.848	273.553	270.263	517.034	147.462	0	**4.089.953**

Wholesale trade

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	61.670	245.459	240.836	2.739.190	973.728	17.988	0	4.278.871
Bologna	76.139	318.891	312.221	3.579.739	1.318.102	23.287	0	5.628.380
Ring	78.133	328.717	320.263	3.870.287	1.419.849	25.513	0	6.042.762
Imola District	59.841	253.155	259.968	3.519.299	1.086.066	20.290	0	5.198.619
Plain	72.145	315.781	323.087	3.679.238	1.331.459	23.868	0	5.745.578
Mountain / Hill	56.242	235.198	244.745	2.897.709	1.006.199	20.237	0	4.460.331
Outer area	90.100	383.458	393.014	4.723.752	1.651.536	31.490	0	7.273.349
Total	494.270	2.080.659	2.094.134	25.009.215	8.786.939	162.673	0	38.627.890

Retail trade

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	108.470	415.900	57.074	158.020	62.856	14.099	0	816.418
Bologna	129.308	521.717	71.443	199.401	82.156	17.624	0	1.021.650
Ring	127.998	518.757	70.689	207.954	85.366	18.625	0	1.029.388

Imola District	101.426	413.342	59.367	195.642	67.558	15.325	0	852.661
Plain	116.453	491.021	70.265	194.784	78.875	17.168	0	968.566
Mountain / Hill	84.494	340.384	49.540	142.782	55.478	13.548	0	686.226
Outer area	145.058	594.712	85.252	249.436	97.584	22.592	0	1.194.633
Total	813.207	3.295.833	463.631	1.348.019	529.874	118.980	0	6.569.543

Accomodation

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	12.801	12.542	1.222	500	862	705	0	28.634
Bologna	15.184	15.655	1.522	628	1.122	877	0	34.988
Ring	14.828	15.357	1.486	646	1.150	914	0	34.381
Imola District	10.715	11.158	1.138	555	830	686	0	25.082
Plain	11.243	12.114	1.231	505	885	702	0	26.680
Mountain / Hill	9.655	9.939	1.027	438	737	656	0	22.452
Outer area	15.774	16.525	1.682	728	1.234	1.041	0	36.984
Total	90.200	93.290	9.310	4.000	6.820	5.580	0	209.200

Food and beverage

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	120.269	32.310	75.781	8.038	63.695	4.520	0	304.612
Bologna	126.824	35.852	83.910	8.972	73.643	4.998	0	334.200
Ring	113.742	32.299	75.223	8.478	69.329	4.786	0	303.857

Imola District	100.656	28.741	70.553	8.907	61.274	4.398	0	274.529
Plain	106.505	31.465	76.955	8.173	65.929	4.540	0	293.567
Mountain / Hill	92.232	26.033	64.757	7.150	55.346	4.277	0	249.796
Outer area	145.584	41.820	102.460	11.485	89.508	6.557	0	397.414
Total	805.812	228.520	549.640	61.204	478.724	34.076	0	2.157.976

Delivery matrices (deliveries/day)

Vehicles and motorcycles

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill
Bologna City Centre	232	2.747	274	257	499	142
Bologna	400	4.992	497	469	945	257
Ring	407	5.096	505	502	1.008	279
Imola District	371	4.671	488	544	918	264
Plain	314	4.095	426	400	791	218
Mountain / Hill	369	4.597	487	474	901	279
Outer area	287	3.635	379	375	717	210
Total	2.379	29.833	3.058	3.021	5.779	1.648

Wholesale trade

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	144	573	562	6.393	2.272	42	0	9.986
Bologna	178	744	729	8.354	3.076	54	0	13.135
Ring	182	767	747	9.032	3.314	60	0	14.102

Imola District	140	591	607	8.213	2.535	47	0	12.132
Plain	168	737	754	8.587	3.107	56	0	13.409
Mountain / Hill	131	549	571	6.763	2.348	47	0	10.409
Outer area	210	895	917	11.024	3.854	73	0	16.974
Total	1.154	4.856	4.887	58.366	20.507	380	0	90.149

Retail trade

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	398	1.528	210	581	231	52	0	2.999
Bologna	475	1.917	262	733	302	65	0	3.753
Ring	470	1.906	260	764	314	68	0	3.782
Imola District	373	1.518	218	719	248	56	0	3.132
Plain	428	1.804	258	716	290	63	0	3.558
Mountain / Hill	310	1.250	182	525	204	50	0	2.521
Outer area	533	2.185	313	916	358	83	0	4.389
Total	2.987	12.108	1.703	4.952	1.947	437	0	24.134

Accomodation

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	171	168	16	7	12	9	0	383
Bologna	203	209	20	8	15	12	0	468

Ring	198	205	20	9	15	12	0	460
Imola District	143	149	15	7	11	9	0	335
Plain	150	162	16	7	12	9	0	357
Mountain / Hill	129	133	14	6	10	9	0	300
Outer area	211	221	22	10	16	14	0	494
Total	1.206	1.247	124	53	91	75	0	2.796

Food and beverage

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	1.203	323	758	80	637	45	0	3.046
Bologna	1.268	359	839	90	736	50	0	3.342
Ring	1.137	323	752	85	693	48	0	3.039
Imola District	1.007	287	706	89	613	44	0	2.745
Plain	1.065	315	770	82	659	45	0	2.936
Mountain / Hill	922	260	648	72	553	43	0	2.498
Outer area	1.456	418	1.025	115	895	66	0	3.974
Total	8.058	2.285	5.496	612	4.787	341	0	21.580

Vehicles matrices (vehicles/day)

Vehicles and motorcycles

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total

Bologna City Centre	79	940	94	88	171	49	0	1.421
Bologna	137	1.709	170	161	324	88	0	2.589
Ring	139	1.745	173	172	345	95	0	2.669
Imola District	127	1.599	167	186	314	90	0	2.484
Plain	108	1.402	146	137	271	75	0	2.138
Mountain / Hill	126	1.574	167	162	308	95	0	2.433
Outer area	98	1.245	130	128	246	72	0	1.918
Total	814	10.214	1.047	1.034	1.979	564	0	15.653

Wholesale trade

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	52	207	203	2.309	821	15	0	3.608
Bologna	64	269	263	3.018	1.111	20	0	4.745
Ring	66	277	270	3.263	1.197	22	0	5.095
Imola District	50	213	219	2.967	916	17	0	4.383
Plain	61	266	272	3.102	1.123	20	0	4.844
Mountain / Hill	47	198	206	2.443	848	17	0	3.761
Outer area	76	323	331	3.983	1.392	27	0	6.132
Total	417	1.754	1.766	21.086	7.408	137	0	32.568

Retail trade

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total

Bologna City Centre	142	544	75	207	82	18	0	1.067
Bologna	169	682	93	261	107	23	0	1.336
Ring	167	678	92	272	112	24	0	1.346
Imola District	133	540	78	256	88	20	0	1.115
Plain	152	642	92	255	103	22	0	1.266
Mountain / Hill	110	445	65	187	73	18	0	897
Outer area	190	777	111	326	128	30	0	1.562
Total	1.063	4.309	606	1.762	693	156	0	8.589

Accomodation

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total
Bologna City Centre	60	59	6	2	4	3	0	134
Bologna	71	73	7	3	5	4	0	164
Ring	69	72	7	3	5	4	0	161
Imola District	50	52	5	3	4	3	0	117
Plain	53	57	6	2	4	3	0	125
Mountain / Hill	45	47	5	2	3	3	0	105
Outer area	74	77	8	3	6	5	0	173
Total	423	437	44	19	32	26	0	980

Food and beverage

Origin	Bologna City Centre	Bologna	Ring	Imola District	Plain	Mountain / Hill	Outer area	Total

Bologna City Centre	396	106	249	26	209	15	0	1.002
Bologna	417	118	276	30	242	16	0	1.099
Ring	374	106	247	28	228	16	0	999
Imola District	331	95	232	29	202	14	0	903
Plain	350	103	253	27	217	15	0	966
Mountain / Hill	303	86	213	24	182	14	0	822
Outer area	479	138	337	38	294	22	0	1.307
Total	2.650	752	1.808	201	1.574	112	0	7.097

Matrix quantities, e.g.: are some relations predominant among the others? Do you see an homogeneous distributio *some zones? Do you see some unexpected phenomena?*

Origin	Bologna city centre	Bologna	Ring	Imola district	Plain	Mountain-hill	Outer area	Total
Bologna city centre	323.933	951.941	399.452	2.928.713	1.145.794	50.001	0	5.799.833
Bologna	383.247	1.338.725	513.603	3.830.725	1.559.584	69.768	0	7.695.652
Ring	371.070	1.350.976	512.865	4.132.311	1.665.888	74.768	0	8.107.877
Imola district	305.797	1.124.305	434.706	3.773.055	1.297.856	64.300	0	7.000.018
Plain	334.440	1.216.726	509.688	3.918.444	1.547.905	65.789	0	7.592.993
Mountain-hill	275.631	1.022.774	403.623	3.090.506	1.198.346	63.650	0	6.054.530
Outer area	422.164	1.361.703	616.331	5.018.947	1.904.017	80.496	0	9.403.658
Total	2.416.282	8.367.150	3.390.268	26.692.701	10.319.391	468.771	0	51.654.562
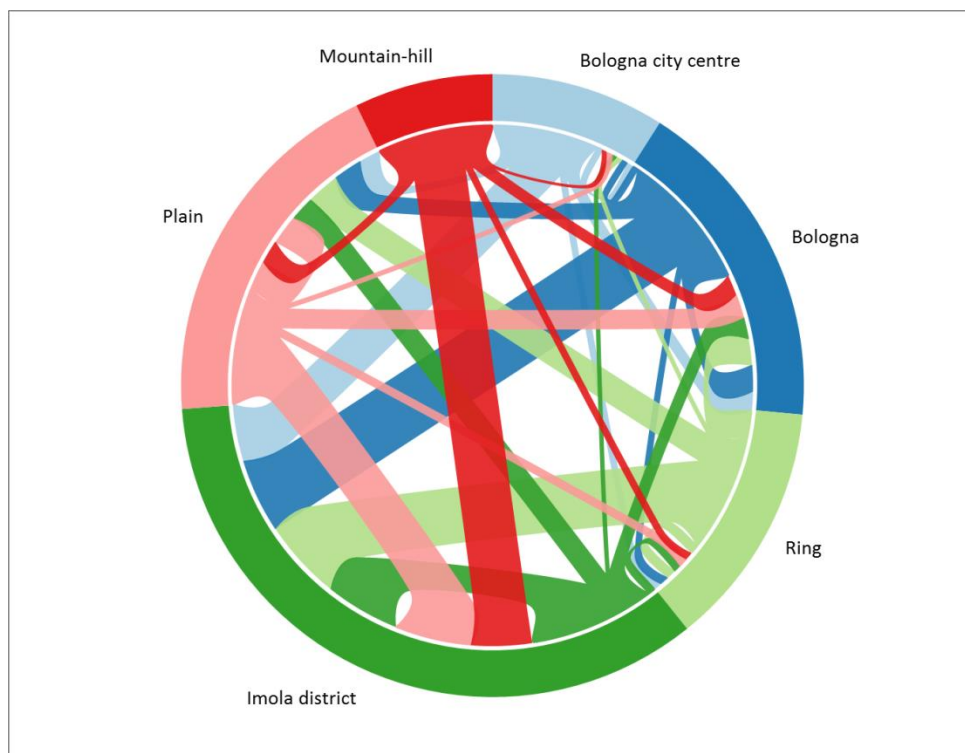
Matrix deliveries, e.g.: are some relations predominant among the others? Do you see an homogeneous distributio some zones? Do you see some unexpected phenomena?

Deliveries/Day

Origin	Bologna city centre	Bologna	Ring	Imola district	Plain	Mountain-hill
Bologna city centre	2.148	5.338	1.820	7.317	3.651	290
Bologna	2.524	8.221	2.348	9.654	5.075	438
Ring	2.395	8.297	2.284	10.392	5.344	467
Imola district	2.033	7.217	2.034	9.572	4.325	421
Plain	2.126	7.112	2.225	9.790	4.859	392
Mountain-hill	1.862	6.789	1.901	7.839	4.016	427
Outer area	2.697	7.354	2.657	12.440	5.842	446
Total	15.783	50.328	15.269	67.005	33.111	2.880
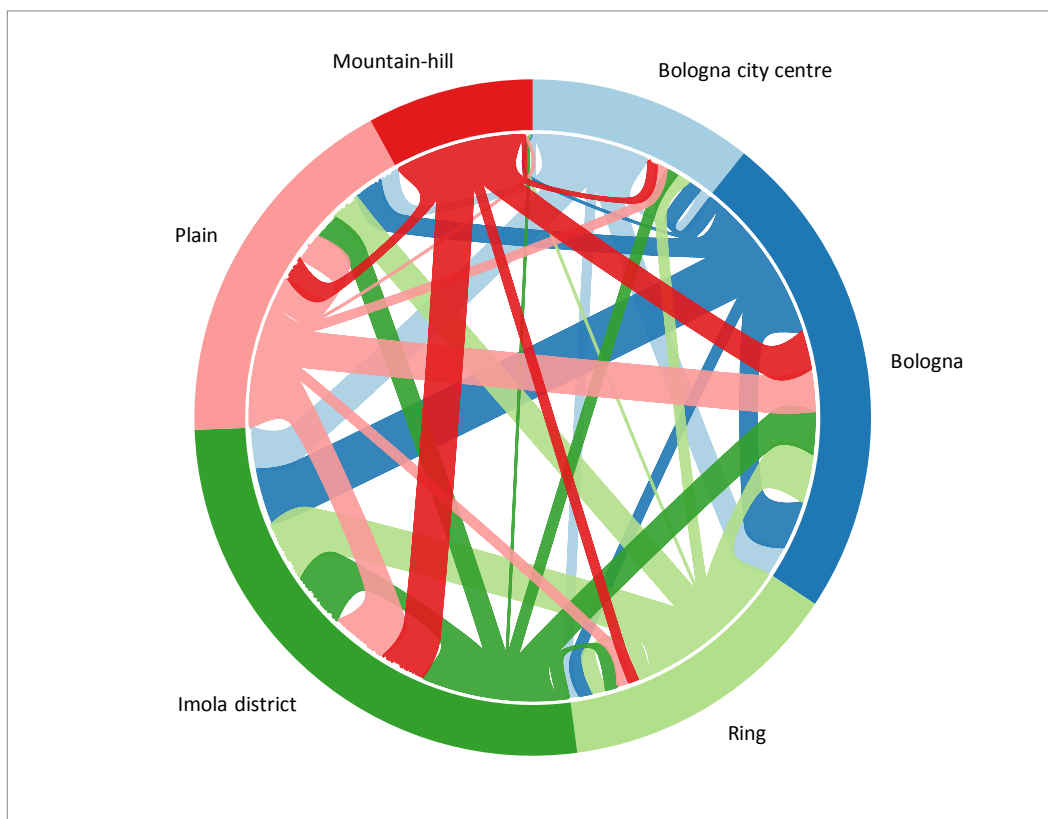
Matrix vehicles, e.g.: are some relations predominant among the others? Do you see an homogeneous distribution or zones? Do you see some unexpected phenomena?
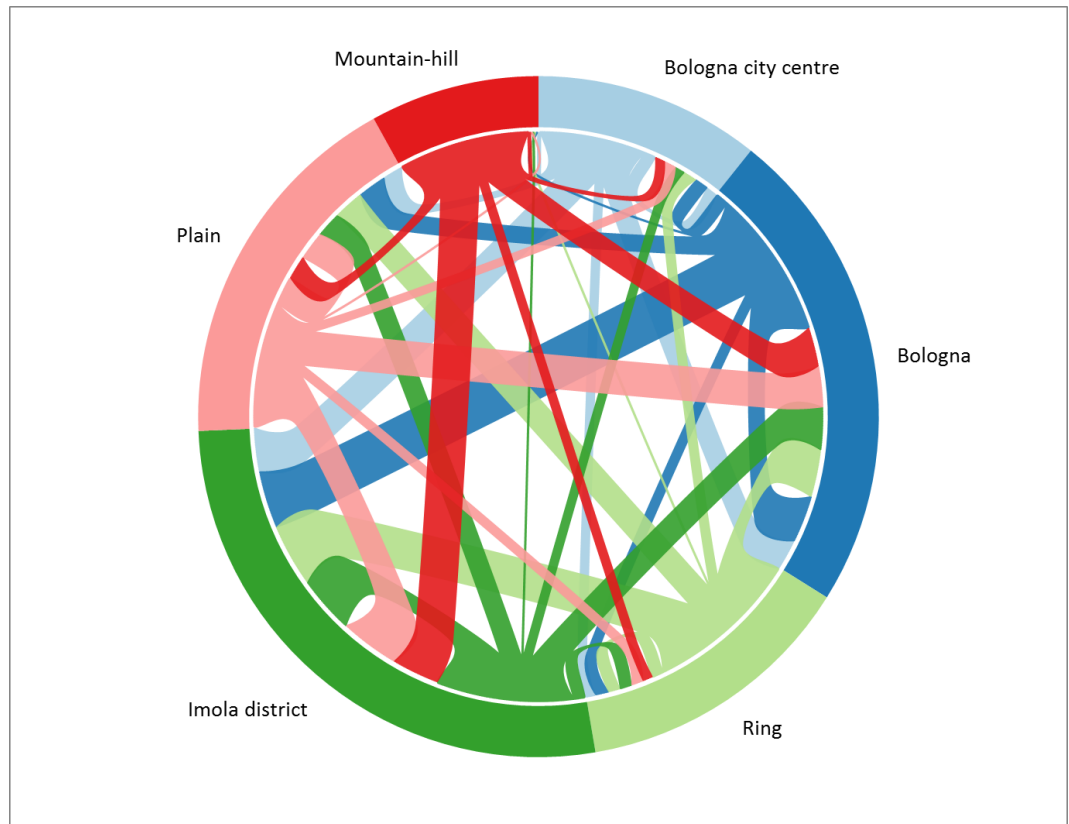
Vehicles/day

Origin	Bologna city centre	Bologna	Ring	Imola district	Plain	Mountain-hill	Outer area	Total
Bologna city centre	729	1.856	627	2.633	1.288	100	0	**7.232**
Bologna	858	2.851	810	3.472	1.790	151	0	**9.933**
Ring	816	2.878	790	3.738	1.887	161	0	**10.270**
Imola district	691	2.500	701	3.441	1.524	145	0	**9.003**
Plain	724	2.470	769	3.523	1.717	135	0	**9.339**
Mountain-hill	633	2.349	656	2.818	1.415	147	0	**8.018**
Outer area	916	2.560	918	4.478	2.066	155	0	**11.093**
Total	5.367	17.466	5.270	24.103	11.686	995	0	**64.887**

Please provide a comment (qualitative description) for your tool's results, e.g.:

- *Vehicle-km travelled by each type of vehicle within the study area*

- *Traffic pollutant and greenhouse emissions*

- *Network assignment*

- *Other?*

The following table reports an assignment of the vehicles (trucks) over the network to calculate the daily performanc

Origin	Bologna city centre	Bologna	Ring	Imola district	Plain	Mountain-hill	Outer area	Total
Bologna city centre	2.550	13.921	7.268	100.044	33.992	4.033	0	161.808
Bologna	6.438	24.237	10.936	138.879	32.038	7.196	0	219.725
Ring	10.281	38.855	18.007	130.827	30.952	5.694	0	234.616
Imola district	27.648	100.001	24.547	44.734	80.606	10.160	0	287.696
Plain	19.825	44.222	12.614	186.353	50.494	8.832	0	322.340
Mountain-hill	26.070	111.826	23.142	197.241	92.243	5.053	0	455.578
Outer area	92.563	239.901	77.070	618.016	243.755	18.699	0	1.290.004
Total	185.376	572.963	173.585	1.416.095	564.080	59.668	0	2.971.766

We also report here the calculation of the LSI to assess (before-after) the introduction of a city logistics measure in th
consists of:

- Multimodal distribution (railways and road) for the urban area of Bologna involving all the FUA (measure at FU

- Last-mile road distribution with electric vehicles

- Logistics spaces in the inner city with cargo bike for distribution.

According to specific hypothesis derived from the above described scenario (See attachment), the resulting LSI (de
improvement.
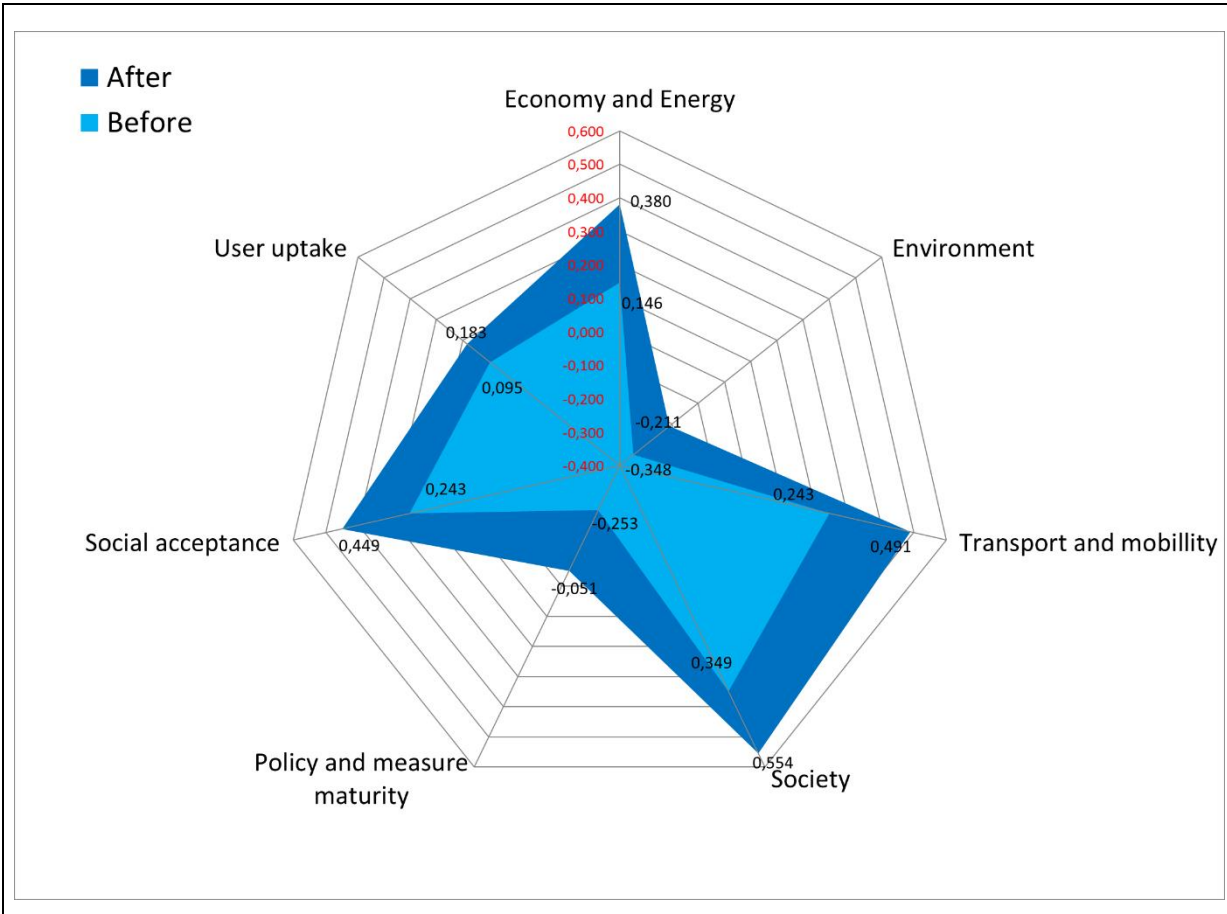
4. Annexes

Please include all the working documents which allowed the results described in the chapters above.

Please, provide as annex:

- *the complete tables of the O/D Matrices (digital attachment)*

- *The final results of the LSI calculations (digital attachment)*

- *The surveys (the questionnaires, not the single answers) in original language*

Freight distribution survey

In the table below we report numbered the elements to be filled in or selected among a list. On the basis of th...
multiplied. By example, in case of several types of suppliers, the related section should be filled in for any of the ty...

General data of the commercial activity				
Information on the shop				
1	Name	Free text	Fill in	
2	Address	Free text	Fill in	
3	Number of employees	Number	Fill in	
Type of activity				
4	Activities	List	Multiple selection	
Dimension of the shop (local commercial unit)				
5	Total area of the shop (m2)	Number	Fill in	
6	Area of the shop for depot (m2)	Number	Fill in	
7	Number of external depots	Number	Fill in	(0 in case of no depot)
Information on the depots (only in case answer to 7 is "1" or "more"). For any depots…				
8	Address	Free text	Fill in	
9	Total area (m2)	Number	Fill in	
10	Distance from the shop (km)	Number	Fill in	
11	Localisation in or out the study area	Yes/No	Select	

Information on the own fleet				
12	Presence of a own fleet	Yes/No	Select	
Data on vehicles of the own fleet (only in case answer to 12 is Yes). For any vehicles…				
13	Type of vehicles	List	Select	Truck, car, van,…
14	Brand	Free text	Fill in	
15	Model	Free text	Fill in	
16	Year of registration	Free text	Fill in	
17	Type of configuration	List	Select	
18	Total weight	Free text	Fill in	
19	Fuel supply type	List	Select	
20	Environmental category	List	Select	Euro 0, Euro 1,…
21	Type of ownership	List	Select	Own, Leasing, Rent,…
22	Usual parking location during operation	List	Select	
23	Details on parking location	Free text	Fill in	Details to answer 22
Supplying process				
Categories of suppliers				
24	Number categories	Number	Fill in	
Supplying process for any category. To be repeated for any category in answer 24.				
25	Name of the category	Free text	Fill in	
26	Number of usual suppliers	Number	Fill in	
27	Type of goods	List	Select	
28	Type of supplier	List	Select	
29	Mode of delivery	List	Select	(DPP,ExWorks, Off truck)
Delivery Duty Paid (DDP). As a case of answer 29				
30	Decision on the DDP modality	List	Select	
31	Delivery mode by the consignor	List	Select	Own account, third party
32	Destination of the delivery	List	Select	Local unit, depot

Deliveries				
33	Summary description of the process	Free text	Fill in	
34	Frequency of the delivery	List	Select	
35	Frequency rate	Number	Fill in	
36	Periods	List	Select	
37	Type of load units	List	Select	
38	Dimension of the load unit	Number	Fill in	
39	Weight of the load unit	Number	Fill in	
40	Maximum number of load units per delivery	Number	Fill in	
41	Average number of load units per delivery	Number	Fill in	
42	Minimum number of load units per delivery	Number	Fill in	
43	Presence of pak periods	Yes/No	Select	
43	Peak periods	Free text	Fill in	In case of Yes of ans 43
44	Changes during peak periods	Free text	Fill in	Quantities, load units,…
45	Presence of off-peak periods	Yes/No	Select	
46	Off-peak periods	Free text	Fill in	In case of Yes of ans 43
47	Changes during off-peak periods	Free text	Fill in	Quantities, load units,…
48	Usual hours of delivery	List	Select	
49	Definition of the hours of delivery	List	Select	
50	Preferred hours of delivery	List	Select	
51	Duration of deliveries	List	Select	Range of minutes
52	Activities during reception of deliveries	Free text	Fill in	
53	Duration of reception activities	Free text	Fill in	

54	Vehicles used for deliveries	List	Select	
55	Parking position of vehicles	List	Select	
56	Availability to receive deliveries in other hours	Yes/No	Select	
Own account collection (eventual)				
57	Depots involved by the collection	List	Select	
Own account collection trip description				
58	Summary description of the trip	Free text	Fill in	
59	Vehicle of the own fleet used	List	Select	
60	Frequency of collection from depot	List	Select	
61	Frequency rate	Number	Fill in	
62	Periods	List	Select	
63	Type of goods collected	List	Select	
64	Type of load units	List	Select	
65	Dimension of load unit	Free text	Fill in	
66	Weight of load unit	Number	Fill in	
67	Maximum number of load units per trip	Number	Fill in	
68	Average number of load units per trip	Number	Fill in	
69	Minimum number of load units per trip	Number	Fill in	
70	Presence of peak periods	Yes/No	Select	
71	Presence of off-peak periods	Yes/No	Select	
72	Usual hours of delivery of the collected goods	List	Select	
73	Duration of deliveries	List	Select	Range of minutes
74	Parking position of vehicles	List	Select	

75	Description of another trip	Yes/No	Select	In case of Yes again to 58
Ex-Work Delivery. As a case of answer 29				
76	Decision on the modality	List	Select	
77	Delivery mode	List	Select	Own account, third party
78	Name of the third party operator (in case)	Free text	Fill in	
79	Presence of express couriers	Yes/No	Select	
80	Multi-category operator	Yes/No	Select	
81	Point of delivery	List	Select	
Deliveries (go to 33)				
Own account collection (eventual). Go to 58				
Own account replenishment (description of the trips)				
82	Summary description of the trip	Free text	Fill in	
83	Vehicle of the own fleet used	List	Select	
84	Categories of suppliers interested	List	Select	
85	Number of suppliers involved in the trip	Number	Fill in	
86	Number of suppliers in the study area	Number	Fill in	
87	Origin of the replenishment trip	List	Select	
88	Destination of the replenishment trip	List	Select	
89	Type of goods collected	List	Select	
90	Type of load units	List	Select	
91	Dimension of load unit	Free text	Fill in	
92	Weight of load unit	Number	Fill in	
93	Maximum number of load units per trip	Number	Fill in	

94	Average number of load units per trip	Number	Fill in	
95	Minimum number of load units per trip	Number	Fill in	
96	Presence of peak periods	Yes/No	Select	
97	Presence of off-peak periods	Yes/No	Select	
98	Usual hours of delivery of the collected goods	List	Select	
99	Duration of deliveries	List	Select	Range of minutes
100	Parking position of vehicles	List	Select	
101	Details on the trip	Free text	Fill in	
102	Usual hours of the trip	List	Select	
103	Frequency of replenishment	List	Select	
104	Frequency rate	Number	Fill in	
105	Periods	List	Select	
106	Description of another trip	Yes/No	Select	In case of Yes again to 82
Off truck. As a case of answer 29				
Deliveries (go to 33)				
Deliveries to end customers				
107	Usual delivery to end-customers	Yes/No	Select	
Deliveries to end customers (description). In case of Yes to 107				
108	Details on deliveries to end customers	Free text	Fill in	
109	Delivery frequency	List	Select	
110	Frequency rate	Number	Fill in	
111	Periods	List	Select	
112	Type of load units	List	Select	
113	Dimension of the load unit	Number	Fill in	
114	Weight of the load unit	Number	Fill in	

115	Maximum number of load units per delivery	Number	Fill in	
116	Average number of load units per delivery	Number	Fill in	
117	Minimum number of load units per delivery	Number	Fill in	
118	Presence of peak periods	Yes/No	Select	
119	Presence of off-peak periods	Yes/No	Select	
120	Usual starting hours of delivery	List	Select	
121	Usual ending hours of delivery	List	Select	
Problems and suggestions				
122	Main issues during loading and unloading	List	Select	
123	Suggestions	Free text	Fill in	

Industrial distribution survey

Mandatory fields in red

1.   General company characteristics

1.1 Company sector (NACE Classification with 3 digits)	

1.2 Location of Local Unit (address, zip code, city)	

1.3 Administrative location (address, zip code, city)	

1.4 Annual turnover in the last three years (€)

2014	**2015**	**2016**

1.5 Total Employees in the last three years (by typology)

Type/Year	**2014**	**2015**	**2016**

Workmen			
Administrative workers			
Managers			
Drivers			

1.6 Vehicle fleet

Your company owns a fleet of road vehicles?   ☐ Yes   ☐ No

If 'yes', please insert the number of vehicle owned by type

	≤ 1.5 t	>1.5 t, ≤ 3.5 t	>3.5 t, ≤ 5 t	>3.
Number of vehicles				
Average age				
EURO V				
EURO VI				
Used for restocking activities (share)				
Used for distribution activities (share)				

1.7 Warehouse

His company has at its disposal a warehouse?   ☐ Yes   ☐ No

If 'yes', please specify:

                                           For production activities

Your company owns it?   ☐ Yes   ☐ No

Dimension (m^2)

It is close to the local unit?   ☐ Yes   ☐ No

If no, specify address   Address:_____

1.8 Rail yard

His company has at its disposal a rail yard?   ☐ Yes   ☐ No

If 'yes', please specify:

Number of railways

Distance from closest train station (km)

Your company owns railway wagons?

If yes, specify the number

☐ Yes   ☐ No

Number:_____

1.9 Freight produced and sold for freight type *(Time reference: last quarter, provide data up to main 5 freight in tons*last quarte*

Freight type (according to a classification to be defined)	Quantity produced (ton*quarter)	Quantity Shipped/outcoming (ton*quarter)	

2. *Incoming and outcoming freight flows*

2.2 Freight type incoming from outside the FUA *(Time reference: last quarter, provide data up to 5 freight types ordered by num*

Freight type(according to a classification to be defined)	Number of shipments	Average quantity for shipment (ton*quarter)	Total quantity (ton*quarter)	Usually Origin from… (*)	Main Tra mode (s (**)

(*) 1: North Italy; 2: Center Italy; 3: South Italy; 4: UE; 5: extra UE; it is possible to include the other provinces of the region
(**) 1: road; 2: rail; 3: other (specify);
(***) 1: Manufacturing activity; 2: Warehouse/Distribution center; 3: Retail activity.

2.3 Freight type incoming from inside the city *(Time reference: last quarter, provide data until 5 freight types ordered by number*

Freight type (according to a classification to be defined)	Number of shipments	Average quantity for shipment (ton*quarter)	Total quantity (ton*quarter)	Usually Origin From (Address or zip code) (*)	Main Tra mode (sh (**)

(*) Specify the origin of the shipment
(**) 1: road; 2: rail; 3: other;
(***) 1: Manufacturing activity; 2: Warehouse/Distribution center; 3: Retail activity.

2.4 Freight type outcoming to outside the city *(Time reference: last quarter, provide data until 5 freight types ordered by number*

Freight type (according to a classification to be defined)	Number of shipments	Average quantity for shipment ton*quarter)	Total quantity (ton*quarter)	Usually Destination To… (*)	Main Tra mode (sh (**)

(*) 1: North Italy; 2: Center Italy; 3: South Italy; 4: UE; 5: extra UE;
(**) 1: road; 2: rail; 3: other;
(***) 1: Manufacturing activity; 2: Warehouse/Distribution center; 3: Retail activity.

2.5 Freight type outcoming to inside the city *(Time reference: last quarter, provide data until 5 freight types ordered by number o*

Freight type (according to a classification to be defined)	Number of shipments	Average quantity for shipment (ton*quarter)	Total quantity (ton*quarter)	Usually Destination To (Address or zip code) (*)	Main Tr mode ((*

(*) Specify the origin of the shipment
(**) 1: road; 2: rail; 3: other;
(***) 1: Manufacturing activity; 2: Warehouse/Distribution center; 3: Retail activity.

2.6 Freight type incoming/outcoming details. *Considering the first filled line in tables 2.2, 2.3, 2.4, 2.5, when the transport mode information related to one shipment.*
If the shipment requires more than a stop, please fill a row for each stop. <mark>Consider only the first five stops.</mark>

Reference table	Vehicle type (ton) (+)	Load quantity (ton)	Load Unit (*)	Time (**)	Type of transport (***)	Sender/ Recipient (#)	Travelled distance (km)
2.2							
1)							
2)							
3)							
4)							
X							
2.3							
1)							
2)							
3)							
4)							
X							
2.4							
1)							
2)							
3)							
4)							
X)							
2.5							
1)							
2)							
3)							
4)							
X							

(+) According to the classification in question 1.6

(*) 1: package, 2: pallet, 3: container, 4: bulk, 5: other

(**) 1: Morning 1 (before 11:00), 2: Morning 2 (before 13:00), 3: Afternoon

(***) 1: own account, 2: thirdy party

(#) 1: Manufacturing activity; 2: Warehouse/Distribution center; 3: Retail activity.

(##) Total number of stops to load/unload the vehicle. If over 10, please enter "M" to indicate many stops.

3. *Infrastructures and services for logistics activities*

3.1 Indicate the infrastructures and the services for logistics activities that are important for your company. Indicate any problem and / or action.

Infrastructure type	Problems (i.e. congestion, lack of services)	Actions (i.e. maintenance)
Primary roads (Roads, Highways)		
_____		
	_____	_____
_____	_____	_____
Interports- rail yard-rail terminals		
_____		
	_____	_____
_____	_____	_____
Ports		
_____	_____	_____
Airports		
_____	_____	_____
_____	_____	_____

Observations

_____

_____

3.2 Considering his experience, there are on the market transport and logistics companies able to meet the needs of the company?	☐	Yes
	☐	No

Observations

_____

Survey on transport operator

QUESTIONNAIRE TO TRANSPORT OPERATORS

Mandatory info highlighted in red

0 General information on the company

0.1 Name of the company   ....

Contact person   ....

Address   ....   Municipality   ....

Type of company

| 1 | SpA | 2 | Ltd | 3 | … | 4 | … | 5 | … | 6 | … | 7 | Other _ |

Interviewee

| 1 | Owner | 2 | Employee | 3 | Manager | 4 | Other_____ |

1 Transport activity

1.1 How many vehicles in the fleet (owned or leased)?

	Number of vehicles	
	Ownership	Leasing/Rent
Van		
Light Truck		
Truck		

1.2   Fill in the form below on the base of the type of vehicles above

> Type (Van/Light Truck/Truck)_____
>
> Brand   _____   Model   _____
>
> Year of registration   _____
>
> Outfit
>
> ☐ Tarpaulin   ☐ hydraulic platform   ☐ Crane   ☐ Dumper
>
> ☐ Cooled   ☐ Refrigerated   ☐ Armored   ☐ Pick-up
>
> other   _____
>
> Weight (total)   ☐ up to 1.5 t   ☐ from 1.5 to 3.5t   ☐ fr
>
> Fuel
> ☐   Gasoline   ☐ Diesel   ☐ Gas   ☐ Hibrid   ☐ E
>
> Environmental features
>
> ☐ Euro 1   ☐ Euro 2   ☐ Euro 3   ☐ Euro 4   ☐ Euro 5   ☐ Euro 6

2   Information on the trips   (Report info on the trips performed by the most used vehicle of the fleet)

2.1   Motivation of the trip
☐   Own account for delivery   ☐   Own account for replenishment

☐   Third party for delivery   ☐   Third party for replenishment

2.2   Origin of the trip (Municipality, typical address)

_____

2.3   Sequence of movements   (at least one trip is to be described)

Types of consignors/consignee. Report the number in the forms below.

1	Manufacturing facility	5	Hotel, restaurant, bar
2	Warehouse	6	End user
3	Retailer	7	Bank, public offices, …
4	Shop	8	Other_____

Types of goods. *Report the number in the forms below.

1	Undergarments	21	Bikes
2	Underwear	22	Clothes
3	Stockings	23	Leisure suits
4	Suits	24	Tous
5	Coats	25	Electronic games
6	Sweaters and shirts	26	Gadgets
7	Shoes and leather	27	Home garments
8	Costume jewerly	28	Textiles
9	Shoes	29	Sewing goods
10	Leather accessories	30	Fabrics
11	Bags	31	Furniture fabrics
12	Suitcases	32	Sewing fabric
13	Umbrellas	33	Tailors' supply
14	Fur coats	34	Textile laboratories' supply
15	Leather garments	35	Upholsterers' supply
16	Accessories	36	Leathers
17	Hats	37	Leathers' laboratory supply
18	Gloves	38	Shoemakers' supply
19	Ties	39	Picture framers' supply
20	Sporting goods	40	Timber labourers' supply

Movement   1 of N

Address   _____

Time of arrival   _____   Duration of the movement   _____

Typer of Consignor   _____   Name of Consignor   _____

Type of Consignee   _____   Name of Consignee   _____

Operation   ☐   Pickup   ☐   Delivery

*Type of goods   ☐☐   Quantity   _____

ADD as many pickup/delivery operations as required by the sequence of stops

2.4   What is the frequency of the movements?

☐   One or more a day   _____
or   frequency

☐   One or more a week   ☐ M   ☐ T   ☐ W   ☐ T   ☐ F   ☐ S
or   days

☐   One or more a month   _____
or   frequency

	Some months a year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
									months

3 Information on deliveries

3.1 Vehicles during deliveries are usually parked

in private reserved area ☐   double park ☐

in loading bays ☐   on the sidewalk ☐

in parking space on the road ☐

3.2 Are you available to deliver in other hours?

Yes ☐   No ☐

3.3 Preferred delivery hours

0-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18

4 Main issues (example to be customized)

4.1 Which are the main issues you experience during the delivery of goods?

☐ lack of loading/unloading space

☐ difficulty to access loading/unloading space

☐ delivery hours

☐ duratin of loading/unloading

☐ safety risk of goods

☐ difficulty to move goods from parking to the shop

☐ need to use transpallet to move goods

☐ lack of coordinatio of deliveries

☐ Other _____

5 Suggestions to improve deliveries

_____

_____

_____

_____